

REMARKS

Claims 1-17, 19-32 and 34-38 are now pending in the application. Of these pending claims, Claims 34-37 have been withdrawn, and Claims 1-17, 19-32 and 38 stand rejected. Claims 1, 10, 17, and 29 have been amended. Minor amendments have been made to the specification and claims to simply overcome the objections to the specification and rejections of the claims under 35 U.S.C. § 112. Support for the amendments can be found throughout the application, drawings and claims as originally filed and, as such, no new matter has been presented. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the amendments and remarks contained herein

REJECTION UNDER 35 U.S.C. § 112

Claims 1, 10, 17 and 29 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended the claims to overcome the rejection.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22, 23, 29-32 and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958). Claims 4

and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22, 23, 29-32 and 38, and further in view of Johnson et al. (U.S. Pat. No. 5,619,177). Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22, 23, 29-32 and 38, and further in view of Tanaka et al. (U.S. Pub. No. 2002/0112788). Claims 10-12 and 14-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22, 23, 29-32 and 38, and further in view of Sugihara et al. (U.S. Pub. No. 2003/0020502). Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22, 23, 29-32 and 38, and further in view of Ingram (U.S. Pat. No. 5,836,066). Claims 25-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254)

further in view of Rivelli (U.S. Pub. No. 2002/0007958), further in view of Ingram (U.S. Pat. No. 5,836,066), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22-24, 29-32 and 38, and further in view of Palmaz et al. (U.S. Pub. No. 2003/0074503). Claim 28 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krulevitch et al. (Thin Film Shape Memory Alloy Microactuators, 1996) in view of Choi et al. (U.S. Pub. No. 2003/0062254) further in view of Rivelli (U.S. Pub. No. 2002/0007958), further in view of Ingram (U.S. Pat. No. 5,836,066), further in view of Palmaz et al. (U.S. Pub. No. 2003/0074503), as applied to Claims 1-3, 5, 6, 8, 9, 13, 17, 19, 20, 22-27, 29-32 and 38, and further in view of Kornrumpf et al. (U.S. Pat. No. 6,655,011). In view of the amendments and arguments herein, these rejections are respectfully traversed.

In rejecting the claims, the Office cites the Rivelli reference for teaching the alloy film is strained (formed to its desired shape) and then annealed (para. 0033) in a manner known in the art, and further teaches the alloy film can be annealed prior to being cut) or released by etching) from a substrate (para. 0030), in a manner known in the art. The Office Action further states it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Krulevitch's method such that the cutting of the polyimide film in a plurality of directions to form a plurality of monolithic thin film actuators occurs after the step of imparting a strain, as taught by Rivelli, by shaping and annealing the alloy film, and then releasing the alloy film from a substrate, in a manner that is known in the art. Applicant traverses this characterization.

At the onset, Applicant submits the Rivelli reference does not teach the formation of multiple actuators. In this regard, the cited paragraph [0030] of Rivelli discloses:

It is formed preferably by sputtering a selected NiTi alloy onto a substrate, e.g., silicon substrate coated with an etchable surface coating, to the desired film thickness, and released from the substrate by etching the substrate coating. Before of after release, the film may be cut, for example, into a ribbon shape, using laser, mechanical or photolithographic cutting methods.

The Examiner's attention is directed to Claim 1, which has been amended to include the limitation:

d) cutting the polymer film in a plurality of directions after imparting a strain to the polymer to form a plurality of monolithic thin film actuators, said plurality of monolithic thin film actuators having generally the same size after the step of imparting a strain.

Applicant notes none of the references cited disclose the formation of a plurality of monolithic thin film actuators after a strain is imparted onto the polymer. This step significantly improves production throughput over prior art systems which strain individual actuators. In this regard, each reference cited discloses the application of force to a single actuator, as opposed to a plurality of actuators prior to the formation of the plurality of actuators.

The Examiner's attention is directed to Claim 17 which has been amended to include the limitation:

e) cutting the shape memory alloy construction in a plurality of directions to form a plurality of monolithic thin film actuators, after imparting a 2% to 8% strain to the shape memory alloy construction, said plurality of monolithic thin film actuators having generally the same size after the step of conducting a post annealing process.

Applicant notes the references are silent as to the limitation form a plurality of monolithic thin film actuators “after imparting a 2% to 8% strain to the shape memory alloy construction.” While each reference alone or together may teach the formation of a single actuator, none of the references teach the formation of a plurality of monolithic thin film actuators, after imparting a 2% to 8% strain, when the actuators have generally the same size after the step of conducting a post annealing process.

With respect to the rejection of Claim 29, Claim 29 has been amended to include the limitations:

[[c)] d) cutting the shape memory alloy construction a plurality of times to form a plurality of monolithic thin film actuators after the step of etching the shape memory alloy film, and after the step of imparting a 2% to 8% strain to the shape memory construction.

As recited above in the discussions of independent Claims 1 and 17, Applicant submits none of the references disclose or suggest this limitation. As such, Applicant submits the Office has failed to make a *prima facie* case of obviousness. Request for withdrawal of the rejection is respectfully requested.


CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the

outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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